

CLAIMS:

1. A retroreflective laminate sheeting having a viewing surface comprising:
a retroreflective layer having a first cap-Y value of a viewing surface side thereof; and
5 a plurality of discrete pigmented indicia disposed on the viewing surface side of the retroreflective layer, wherein the pigmented indicia define a second cap-Y value of the viewing surface of the sheeting, the second cap-Y value being less than the first cap-Y value.
- 10 2. The sheeting of claim 1 wherein the retroreflective layer is selected from cube corner-based sheeting and microsphere-based sheeting.
3. The sheeting of claim 2 wherein the cube corner-based sheeting comprises a structured surface provided with a plurality of cube corner elements.
- 15 4. The sheeting of claim 3 wherein the cube corner elements are bounded by at least two intersecting sets of parallel grooves, and wherein the pigmented indicia are not aligned with the grooves.
- 20 5. The sheeting of claim 2 wherein the microsphere-based sheeting comprises a plurality of microspheres at least partially embedded in a binder layer.
6. The sheeting of claim 5 further comprising a reflective material proximate the binder layer.
- 25 7. The sheeting of claim 1 further comprising:
a substantially transparent overlay layer having a front surface and a rear surface, the rear surface being proximate the viewing surface side of the retroreflective layer, wherein the pigmented indicia are disposed on
30 a surface of the overlay layer.

8. The sheeting of claim 7, wherein the pigmented indicia are disposed between the rear surface of the overlay layer and the viewing surface side of the retroreflective layer.

5 9. The sheeting of claim 1, wherein the indicia comprise a plurality of parallel stripes.

10. The sheeting of claim 9, wherein the stripes have a substantially uniform stripe width.

10 11. The sheeting of claim 10, wherein the stripe width is from about 0.1 mm to about 1.0 mm.

12. The sheeting of claim 9, wherein the stripes have a distribution density of from about 2 to about 10 stripes per centimeter (about 5 to about 25 stripes per inch).

15 13. The sheeting of claim 9, wherein the stripes vary in width.

14. The sheeting of claim 9, wherein at least some of the stripes are not continuous.

20 15. The sheeting of claim 1, wherein the pigmented indicia are substantially gray.

16. The sheeting of claim 1, wherein the pigmented indicia are substantially black.

25 17. The sheeting of claim 1, wherein the pigmented indicia cover from about 10% to about 25% of the viewing surface side of the retroreflective layer.

18. The sheeting of claim 1, wherein the indicia comprise a plurality of sets of parallel stripes, and wherein the stripes of one set are offset from the stripes of an adjacent set.

30 19. The sheeting of claim 1, wherein the pigmented indicia comprise an opaque ink.

20. The sheeting of claim 1 further comprising:
a transparent color layer.

21. The sheeting of claim 1 in which:

the retroreflective layer has a first brightness value of a viewing surface side thereof;
and

the plurality of discrete pigmented indicia define a second brightness value of the
viewing surface of the sheeting, the second brightness value being less than the
first brightness value.

22. The sheeting of claim 21 in which the second brightness value is less than about 70%
of the first brightness value.

23. The sheeting of claim 1 further comprising:

an adhesive layer disposed on a side of the retroreflective layer opposite the viewing
surface side; and

a release liner disposed adjacent the adhesive.

24. A method of making a retroreflective sheeting having a viewing surface, comprising:

forming a retroreflective layer on a web, the retroreflective layer having a first cap-Y
value on a viewing surface side thereof, the web moving in a web direction;
and

applying a pigmented material proximate the retroreflective layer, the pigmented
material forming a plurality of parallel stripes oriented substantially in at least
one of the web direction and a direction orthogonal to the web direction;

wherein the pigmented material defines a second cap-Y value of the viewing surface
of the sheeting, the second cap-Y value being less than the first cap-Y value.

25. The method of claim 24 wherein the step of applying the pigmented material includes
applying the pigmented material to an overlay layer.

26. The method of claim 25 further comprising laminating the overlay layer to the retroreflective layer on the viewing surface side thereof.

5 27. The method of claim 26 wherein the pigmented material is sandwiched between the overlay layer and the retroreflective layer.

28. The method of claim 24 wherein the retroreflective layer is selected from cube corner-based sheeting and microsphere-based sheeting.

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29. The method of claim 28 wherein the cube corner-based sheeting comprises a structured surface provided with a plurality of cube corner elements.

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30. The method of claim 29 wherein the cube corner elements are bounded by at least two intersecting sets of parallel grooves, and wherein the pigmented indicia are not aligned with the grooves.

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31. The method of claim 28 wherein the microsphere-based sheeting comprises a plurality of microspheres at least partially embedded in a binder layer.

32. The method of claim 31 wherein the microsphere-based sheeting further comprises a reflective material proximate the binder layer.

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33. The method of claim 24, wherein the stripes have a substantially uniform stripe width.

34. The method of claim 33, wherein the stripe width is from about 0.1 mm (about 4 mils) to about 1.0 mm (about 39 mils).

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35. The method of claim 24, wherein the stripes have a distribution density of from about 2 to about 10 stripes per centimeter (about 5 to about 25 stripes per inch).

36. The method of claim 24, wherein the stripes vary in width.

37. The method of claim 24, wherein at least some of the stripes are not continuous.

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38. The method of claim 24, wherein the pigmented material is substantially gray.

39. The method of claim 24, wherein the pigmented material is substantially black.

10 40. The method of claim 24, wherein the pigmented material covers from about 10% to about 25% of the viewing surface side of the retroreflective layer.

41. The method of claim 24, wherein the pigmented material comprises a plurality of sets of parallel stripes, and wherein the stripes of one set are offset from the stripes of an adjacent set.

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42. The method of claim 24, wherein the pigmented material comprises an opaque ink.

43. The method of claim 24, further comprising:

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applying a second pigmented material to an overlay layer, the second pigmented material transforming the overlay layer into a transparent color layer.

44. A method of making a retroreflective sheeting having a viewing surface, comprising:
forming a cube corner-based retroreflective layer on a web, the retroreflective layer
25 having a first cap-Y value on a viewing surface side thereof, the web moving
in a web direction, wherein the layer comprises a structured surface provided
with a plurality of cube corner elements, the cube corner elements being
bounded by at least two intersecting sets of parallel grooves; and
applying a pigmented material proximate the retroreflective layer, wherein the
30 pigmented material is not aligned with the grooves;

wherein the pigmented material defines a second cap-Y value of the viewing surface of the sheeting, the second cap-Y value being less than the first cap-Y value.

45. The method of claim 44 wherein the step of applying the pigmented material includes
5 applying the pigmented material to an overlay layer.

46. The method of claim 45 further comprising laminating the overlay layer to the retroreflective layer on the viewing surface side thereof.

10 47. The method of claim 46 wherein the pigmented material is sandwiched between the overlay layer and the retroreflective layer.

48. The method of claim 44 wherein the pigmented material forms a plurality of parallel stripes.
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49. The method of claim 48, wherein the stripes have a substantially uniform stripe width.

50. The method of claim 49, wherein the stripe width is from about 0.1 mm (about 4 mils) to about 1.0 mm (about 39 mils).
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51. The method of claim 48, wherein the stripes have a distribution density of from about 2 to about 10 stripes per centimeter (about 5 to about 25 stripes per inch).

52. The method of claim 48, wherein the stripes vary in width.
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53. The method of claim 48, wherein at least some of the stripes are not continuous.

54. The method of claim 44, wherein the pigmented material is substantially gray.

30 55. The method of claim 44, wherein the pigmented material is substantially black.

56. The method of claim 44, wherein the pigmented material covers from about 10% to about 25% of the viewing surface side of the retroreflective layer.

5 57. The method of claim 44, wherein the pigmented material comprises a plurality of sets of parallel stripes, and wherein the stripes of one set are offset from the stripes of an adjacent set.

58. The method of claim 44, wherein the pigmented material comprises an opaque ink.

10 59. The method of claim 44, further comprising:
applying a second pigmented material to an overlay layer, the second pigmented
transforming the overlay layer into a transparent color layer.

15 60. A method of controlling a cap-Y value of a retroreflective sheeting having a viewing surface, comprising:
providing a retroreflective layer, the retroreflective layer having a first cap-Y value on
a viewing surface side thereof; and
applying a pigmented material proximate the retroreflective layer;
20 wherein the pigmented material defines a second cap-Y value of the viewing surface
of the sheeting, the second cap-Y value being less than the first cap-Y value.

61. The method of claim 60 wherein the step of applying the pigmented material includes
applying the pigmented material to an overlay layer.

25 62. The method of claim 61 further comprising laminating the overlay layer to the
retroreflective layer on the viewing surface side thereof.

30 63. The method of claim 62 wherein the pigmented material is sandwiched between the
overlay layer and the retroreflective layer.

64. The method of claim 60 wherein the retroreflective layer is selected from cube corner-based sheeting and microsphere-based sheeting.

5 65. The method of claim 64 wherein the cube corner-based sheeting comprises a structured surface provided with a plurality of cube corner elements.

66. The method of claim 65 wherein the cube corner elements are bounded by at least two intersecting sets of parallel grooves, and wherein the pigmented indicia are not aligned with
10 the grooves.

67. The method of claim 64 wherein the microsphere-based sheeting comprises a plurality of microspheres at least partially embedded in a binder layer.

15 68. The method of claim 67 wherein the microsphere-based sheeting further comprises a reflective material proximate the binder layer.

69. The method of claim 60 wherein the pigmented material forms a plurality of parallel stripes.
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70. The method of claim 69, wherein the stripes have a substantially uniform stripe width.

71. The method of claim 70, wherein the stripe width is from about 0.1 mm (about 4 mils) to about 1.0 mm (about 39 mils).
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72. The method of claim 69, wherein the stripes have a distribution density of from about 2 to about 10 stripes per centimeter (about 5 to about 25 stripes per inch).

73. The method of claim 69, wherein the stripes vary in width.
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74. The method of claim 69, wherein at least some of the stripes are not continuous.
75. The method of claim 60, wherein the pigmented material is substantially gray.
- 5 76. The method of claim 60, wherein the pigmented material is substantially black.
77. The method of claim 60, wherein the pigmented material covers from about 10% to about 25% of the viewing surface side of the retroreflective layer.
- 10 78. The method of claim 60, wherein the pigmented material comprises a plurality of sets of parallel stripes, and wherein the stripes of one set are offset from the stripes of an adjacent set.
79. The method of claim 60, wherein the pigmented material comprises an opaque ink.
- 15 80. The method of claim 60, further comprising:
applying a second pigmented material to an overlay layer, the second pigmented material transforming the overlay layer into a transparent color layer.
- 20 81. The sheeting of claim 4 wherein the retroreflective layer comprises a web and the pigmented indicia comprise a plurality of stripes oriented substantially in at least one of the web direction and a direction orthogonal to the web direction.